

इंटरनेट

मानक

Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 15642-1 and 2 (2006): Quick methods for detection of adulterants/contaminants in common food products [FAD 16: Foodgrains, Starches and Ready to Eat Foods]



“ज्ञान से एक नये भारत का निर्माण”

Satyanarayan Gangaram Pitroda

“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

BLANK PAGE



भारतीय मानक

सामान्य खाद्य उत्पादों में अपमिश्रिकों/संदूषकों की
पहचान की द्रुत विधियाँ

Indian Standard

QUICK METHODS FOR DETECTION OF
ADULTERANTS/CONTAMINANTS IN COMMON
FOOD PRODUCTS

ICS 67.050

© BIS 2006

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Foodgrains, Starches and Ready-to-Eat Foods Sectional Committee had been approved by the Food and Agriculture Division Council.

Food is an essential and basic requirement for nourishing and sustenance of human life. Preparation of food products from the raw agriculture produce to their final stage of consumption is a big business worldover. Food is adulterated by unscrupulous persons from time immemorial and is continued even today for certain commercial benefits. With the development of food science and technology, the techniques of adulteration have also changed and contamination is often observed due to unhygienic practices, chemicalization of technology, etc. Food adulteration may lead to innumerable health hazards. Food adulteration is thus a punishable offence under the provisions of the *Prevention of Food Adulteration Act*, 1954 and the Rules made thereunder.

Consumer awareness regarding the quality of food and alertness in detection of common type of food adulteration can help in arresting this menace and provide a healthy and wholesome food to the consumers. Therefore, simple methods to detect adulteration/contamination of various foods at the household level will be useful to the consumers to select a right type of food or to avoid foods of doubtful quality. Keeping this in view this standard has been formulated. This standard includes methods involving visual examination, physical methods and methods involving the use of certain chemicals and reagents. Part 1 of this standard covers methods where only visual examination or physical tests are involved while Part 2 covers tests where simple chemical reactions are involved.

The test methods contained in this standard are very simple and quick, thereby making them useful for school children, housewives, social workers, etc, or any other person for detecting food adulteration and contamination. Based on these methods, certain quick test kits can also be developed which may be used by schools for imparting basic education in detecting adulteration or contamination or by housewives, women organizations or voluntary consumer organization for detecting adulteration in foods. However, these quick methods are only indicative of possible adulteration/contamination in food items, and need to be confirmed by other detailed methods.

While formulating this standard, assistance has been drawn from the information provided by the National Institute of Nutrition, Hyderabad, Ramakrishna Bajaj — CFBP Consumer Education and Testing Center, Mumbai and CONCERT, Chennai a Voluntary Consumer Organization.

Annex A, which is informative only, contains the botanical names of the plants which find reference in this standard.

Indian Standard

QUICK METHODS FOR DETECTION OF ADULTERANTS/CONTAMINANTS IN COMMON FOOD PRODUCTS

PART 1 PHYSICAL METHODS

1 SCOPE

This section prescribes physical methods for detection of adulterants/contaminants in common food products.

2 APPARATUS

- a) *Cotton* — absorbant;
- b) *Dropper*;
- c) *Filter paper* — ordinary or blotting paper;
- d) *Forceps*;
- e) *Glass beakers* — 100 ml and 250 ml capacity;
- f) *Magnet* — a powerful magnet;
- g) *Magnifying glass* — with a handle of about 7.5 cm length and having magnification of 10 ×;
- h) *Matchstick*; and
- j) *Milk lactometer* with lactometer jar.

3 TEST METHODS

3.1 Detection of Foreign Matter

3.1.1 General

Foodgrains meant for human consumption shall be whole or broken kernels of cereals and pulses. Small stones, marble chips identical to foodgrains and pulses are mixed or get mixed, if good agricultural practices are not followed. Rodent hair and excreta of animals are also found in foodgrains, if not properly stored. These inorganic foreign matters may irritate the mucus membrane of human digestive system. Similarly, the excreta of animal origin may carry harmful bacteria.

3.1.2 Procedure

Spread approximately 100 g of smaller size foodgrains like *rice*, *ragi*, *bajra*, etc, and 250 g of bigger size foodgrains like wheat, pulses, oil seeds, etc, on a white paper. Using the magnifying glass visually examine the foodgrains closely. Any foreign matter in foodgrains will be clearly visible and can be picked up by using forceps.

3.2 Detection of Ergot Effected Grains

3.2.1 General

Wheat and *bajra* are affected by ergot which is a fungus and can liberate toxins in the affected grains.

3.2.2 Procedure

Spread approximately 50 g of bigger size and 25 g of small size foodgrains on a white paper. Using a magnifying glass examine the grains closely. The ergot affected grains will be purple black in colour and slightly longer in size than the normal size. These can be separated out using forceps.

3.2.3 The ergot affected grains can also be detected by taking 20 percent common salt solution in a beaker and adding some affected grains to this. The ergot affected grains will float on the top while the healthy grains will settle at the bottom.

3.3 Detection of *Datura* Seeds/*Argemone* Seeds/*Khesari* and *Khesari Dal* in Foodgrains

3.3.1 General

Foodgrains meant for human consumption shall be free from poisonous and harmful seeds like *Datura*, *Argemone mexicana*, *Khesari* (*Lathyrus sativus*) and *Khesari dal* in any form. *Argemone mexicana* seeds contain alkaloids-sanguinarine and dihydro sanguinarine which are toxic and cause epidemic dropsy. *Khesari* seeds are flat and yellow and light grey in colour. *Khesari/Khesari dal* contains a toxic amino acid BOAA (Beta oxalyl amino alanine) which causes crippling paralysis. *Datura* seeds are intoxicants.

3.3.2 Procedure

Spread about 25 g of foodgrains on a white paper. Using a magnifying glass visually examine the grains closely. *Datura* seeds look like chilly seeds, *Argemone* seeds look like mustard seeds but it contains a spike and grainy rough surface while mustard seeds have a smooth surface. Also *Argemone* seeds are black in colour. When crushed, mustard seeds are yellowish inside while *Argemone* seeds are white. *Khesari Dal* can be detected by their physical appearance which is wedge shaped having a slant on one side and appear square as compared to other *dals*.

3.4 Detection of Iron Filings in *Rava* and Tea Dust

3.4.1 General

Suji or *rava* means a product obtained by grinding and

bolting of wheat free from rodent hair and excreta while tea means, a product exclusively obtained from the leaves, buds and tender stems of plant *Camellia* genus. Iron filings get into rava and tea during the manufacturing process. Due to the constant wear and tear of the machinery, fine particles of iron may enter into the food product. If the iron particles go unnoticed it may damage the digestive system and, therefore, shall be removed before the consumption of the food.

3.4.2 Procedure

Spread about 50-100 g of rava/tea dust on a white paper. Plough the magnet through the food item several times. The iron filings will stick to the magnet and can be easily detected.

3.5 Detection of Artificially Coloured Tea Dust Mixed with Genuine Tea

3.5.1 General

Tea being a cheap beverage and a product of mass consumption has a potential of adulteration. Genuine tea is mixed with the used tea which is collected from tea shops. This tea collected from the tea shops is sprinkled with water soluble coal tar dyes and dried under sun or air and mixed with the genuine tea. Tea is also sometimes coloured to get a dark coloured decoction for giving an impression that the tea is of good quality.

3.5.2 Procedure

Take about 5 g of tea leaves/dust and place it in the center of a filter paper. Using the dropper, add water drop by drop at the heap of the tea leaves/dust. If the genuine tea is adulterated with a coloured tea, water will dissolve the added colour and leave streaks of colour on the filter paper.

3.6 Detection of Chicory Powder in Coffee

3.6.1 General

Coffee powder means a material made from freshly roasted and ground pure coffee beans while chicory powder means the material prepared by roasting and grinding of cleaned and dried chips of chicory roots. The addition of chicory to the coffee is not allowed unless the product is labelled as coffee-chicory mixture. The chicory root has a characteristic structure and dissolves in cold water due to the presence of inulin. This feature can be made use of in distinguishing chicory from coffee.

3.6.2 Procedure

Take about 50 ml of water in a beaker and sprinkle the doubtful coffee powder on the surface of water. Pure coffee powder will float on the surface of the water

while chicory powder will sink with a brownish red colour to the bottom of the beaker.

3.7 Detection of Cassia Bark in Cinnamon

3.7.1 General

Cinnamon (Dalchini) means the dried pieces of the inner bark of *Cinnamomum zeylanicum* Blume. *Cassia* (*Tej*) means dried pieces of bark of *Cinnamomum cassia* blume. Offering or substituting *Cassia* bark in place of *Cinnamon*, (which is a common trade name) is an act of deceiving the consumer. *Cassia* can be sold only in the name of *Cassia* and not as *Cinnamon*.

3.7.2 Procedure

Cinnamon barks are very thin and can be rolled. It can be rolled around a pencil or pen. It has a distinct smell. Whereas *cassia* bark are very thick and stiff and cannot be rolled. *Cassia* bark comprises of several layers in between the rough outer and inner most smooth layers. On examination of the bark closely, a clear distinction can be made.

3.8 Detection of Pappaya Seeds in Black Pepper

3.8.1 General

Black pepper is a common spice used in household both for flavouring and for its medicinal value. It is obtained from the dried berries of *Piper nigrum* L. It is commonly adulterated with dried Pappaya fruit seeds which have similar appearance. Substituting pepper with pappaya seeds is an act of adulteration. Apart from financial loss, a consumer may not get the value of medicinal effect, which he normally expects from this valuable spice. In addition, the pappaya seed may create or add to the digestive problems.

3.8.2 Procedure

Spread the spice on a white paper. Closely, observe the appearance of the sample, using the magnifying glass. Black pepper is brown to black in colour. It has wrinkled surface and has a characteristic smell and pungent taste. The pappaya seed has shrunken smooth surface and oval shape. It is greenish brown or blackish brown in colour and has a repulsive flavour.

3.9 Detection of Added Colour and Brick Powder in Chilli Powder

3.9.1 General

Chilli powder (Lal Mirchi) means the powder obtained by grinding clean dried chilly pods of *Capsicum frutescens* L/*Capsicum annum*. Chilli powder is widely used as a condiment in every household. To increase the bulk and to appear better, chilli powder is adulterated with brick powder and water soluble coal

tar colour respectively. The colour is also added to mask the added starch and to increase the brightness in the case of a substandard chilli powder. The coal tar colour may be injurious to health. The brick powder may irritate the stomach and damage the teeth and intestinal lining.

3.9.2 Procedure

Sprinkle 25 g of chilli powder on the surface of water in a glass beaker. Artificial colourants will descend as coloured streaks. Brick powder will settle down at the bottom due to its heaviness.

3.10 Detection of Dried Maize Fibres in Saffron

3.10.1 General

Saffron means the dried stigmata or tops of styles of *Crocus sativus*. Saffron is a food classified under spices and condiments. It is one of the costlier natural flavouring and colouring agent with rare nutritional quality. Due to its high cost, it is adulterated with dyed tendrils of maize cob and coloured paper strips.

3.10.2 Procedure

Take some saffron and spread it on a piece of paper and observe closely with the help of the magnifying glass. The magnified structure of the plant part like stigma, style can be easily identified while the paper strips will be seen flat and thin. The genuine saffron will not break easily while the spurious saffron will break. Also take some saffron sample and dissolve it in water taken in a beaker. The separation of colour will indicate the presence of spurious saffron prepared by soaking maize cob in sugar and colouring it with coal tar colour.

3.11 Detection of Water in Milk

3.11.1 General

Water is the most common adulterant in milk. Its addition straight away adds to the volume and goes unnoticed because there is no change in colour of the milk because of its addition. However, pure milk has a normal specific gravity between 1.030 and 1.034 at room temperature (27°C). Any addition of water to milk will disturb the specific gravity of milk. This fact can be used to detect adulteration of milk with water.

3.11.2 Procedure

Take milk in a lactometer jar and slowly immerse the lactometer in milk. The lactometer reading which is indicative of the specific gravity of the milk shall be between 1.030 and 1.034. The lactometer reading less than 1.030 is an indication of the addition of water in milk.

3.12 Detection of Sugar and Water in Honey

3.12.1 General

Pure honey is a natural sweet substance produced by honey bees from the nectar of blossoms or from secretions of plants which honey bees collect, transform and store in honey combs for ripening. However, there is a common practice to adulterate honey with sugar dissolved in water. Though it may not cause any harmful health effect, yet it remains an unethical way of making commercial profits.

3.12.2 Procedure

Take some cotton and make a wick out of it. Dip the wick in the honey and burn it with the help of matchstick. The cotton wick, dipped in honey adulterated with water and sugar will either not burn or burn with a cracking sound.

3.13 Detection of Artificial Coloured Green Peas

3.13.1 General

Green peas in their natural form may vary from light green to dark green in colour. However, to make them look fresh and attractive the peas are artificially coloured with coal tar dyes. Sometimes, they are coloured with non-permitted dyes like malachite green, congo red and yellow aniline dyes.

3.13.2 Procedure

Take little amount of green peas in a 250 ml beaker add water to it and mix well. Let it stand for half an hour. Clear separation of colour in water indicates adulteration.

3.14 Detection of Exhausted/Deoiled Cloves in Sound Cloves

3.14.1 General

Cloves (*Laung*) means the dried, unopened flower buds of *Eugenia caryophyllus* (*C. sprengel*). Cloves have characteristic smell of Eugenol. Genuine Clove contains not less than 15 percent v/w volatile oil which has medicinal value. It is used as a strong natural flavouring agent in cookery. The abundant volatile oil is extracted fully or partially and the exhausted cloves are mixed with genuine ones.

3.14.2 Procedure

Using the magnifying glass, observe the individually spread cloves closely. Exhausted cloves can be identified by its small size and shrunken appearance. The characteristic pungent taste of genuine cloves is less pronounced in exhausted cloves.

3.15 Detection of Aluminium Leaves Being Sold as Silver Leaves

3.15.1 General

Pure silver leaves in a very fine thinness are extensively used to give good appearance to Indian sweets as well as are used in *paan* (betel leaves). Silver leaves have some medicinal values also. However, because of silver leaves being costly, aluminium leaves obtained to very fine thinness are often passed on as silver leaves.

3.15.2 Procedure

Take some portion of the leave and crush it between two fingers. Pure silver leaves will be easily crushed and crumble to the powder form while aluminium leave will only break into smaller shreds. Further, take the suspected silver leaves and make it in the form of a ball and burn it with the help of a flame. Pure silver leaves burn away completely leaving glistening balls while aluminium leaves are reduced to grey ash.

Indian Standard

QUICK METHODS FOR DETECTION OF ADULTERANTS/CONTAMINANTS IN COMMON FOOD PRODUCTS

PART 2 CHEMICAL METHODS

1 SCOPE

This section prescribes chemical methods for detection of adulterants/contaminants in common food products.

2 APPARATUS

- a) Cotton;
- b) *Filter paper* — ordinary;
- c) Gas burner/spirit lamp;
- d) Litmus paper;
- e) Matchstick;
- f) Milk lactometer with lactometer jar;
- g) Tea spoon; and
- h) *Test tube* — 150 × 18 mm.

3 REAGENTS

- a) *Acetonitrile Reagent* — prepared by mixing acetonitrile and water in 7:3 ratio;
- b) *Alcoholic Potash* — prepared by dissolving 8.6 g of potassium hydroxide in 100 ml alcohol;
- c) *Ammonium Molybdate Solution* — prepared by dissolving 1 g ammonium molybdate in 100 ml concentrated sulphuric acid;
- d) *Antimony Trichloride* — prepared by dissolving 40 g of antimony trichloride in 100 ml of chloroform;
- e) Chloroform;
- f) Concentrated hydrochloric acid;
- g) Concentrated nitric acid;
- h) *Dilute Hydrochloric Acid* — 1:1 (prepared from concentrated hydrochloric acid);
- j) *Ferric Chloride* — prepared by dissolving 6 g ferric chloride in 100 ml of water;
- k) Hexane;
- m) *Iodine Solution* — prepared by dissolving 12.69 g of iodine and 24 g of potassium iodine in 1 litre water;
- n) *p-Dimethyl Amino Benzaldehyde Reagent* — 1.6 percent in ethyl alcohol containing 10 percent hydrochloric acid;
- p) Petroleum ether;

- q) *Potassium Chromate Solution* — prepared by dissolving 5 g of potassium chromate in 100 ml water;
- r) *Potassium Iodide* — prepared by dissolving 10 g of potassium iodide in 100 ml water;
- s) *Rectified Spirit* — 95 percent ethyl alcohol;
- t) *Resorcinol Solution* — about 2 percent;
- u) *Rosalic Acid* — prepared by dissolving 1 g rosalic acid in 100 ml of ethyl alcohol;
- v) *Silver Nitrate Solution* — 0.1 N; and
- w) *Starch Solution* — freshly prepared by dissolving 1 g starch in 100 ml water and boiling it.

4 TEST METHODS

4.1 Detection of Non-edible Gum/Resin in Asafoetida (*Hing*)

4.1.1 General

Pure asafoetida gives a milky white solution in water. However, if the asafoetida is adulterated with other resins, the adulterants have to be detected by certain chemical methods. Colophony is a resin obtained as a residue after the distillation of turpentine oil. This is one of the adulterants in asafoetida. Colophony forms a coloured complex when shaken with rectified spirit and ferric chloride.

4.1.2 Procedure

4.1.2.1 Method I

Powder a gram of asafoetida and take it in a test-tube. Add one tea spoon of water. Mix thoroughly by shaking. Milky white solution with no sediments represents pure asafoetida. Further, a small amount of powdered asafoetida, taken in a spoon and burnt on a gas flame, burns with a bright flame like camphor, which is an indication of pure asafoetida.

4.1.2.2 Method II

Take 1 g of asafoetida, powder it thoroughly and take it in a test-tube. Add some rectified spirit and filter/decant the solution. Take 5 ml of filtrate and add few drops of ferric chloride solution. Olive green colour shows the presence of adulteration with other resins.

4.2 Detection of Starch in Milk Products Like *Khoya*, Butter and Cheese

4.2.1 General

Starch is a common adulterant in milk products as it gets easily mixed up with these products because of the similarity in the colour. Starch adds to the weight of the products, and is, therefore, a cheap source of adulteration. The adulteration of these products with starch can be detected by addition of iodine to these products which results in the formation of a blue colour. The blue colour is due to the formation of an inclusion complex between iodine and the amylose. The amylose coils into the spiral and the iodine molecule aligns within the centre of this spiral and causes light absorption which gives a blue colour.

4.2.2 Procedure

Take about 2 g of milk product in a test-tube and add about 5 ml water to it. Boil for a few minutes on the gas burner. Cool and add iodine solution to the test-tube. The formation of a blue colouration shows the presence of starch.

4.3 Detection of Neutralizers in Milk

4.3.1 General

Milk sold in the cities is being transported from a longer distance. If the milk is not transported at a low temperature, there is every likelihood of its getting spoilt because of bacterial action. Neutralizers are added in the milk to avoid spoilage of milk but their addition to milk is not permitted under *PFA Rules*. Common neutralizers used are sodium hydroxide, sodium carbonate and sodium bicarbonate. The presence of neutralizers can be detected by use of alcoholic rosolic acid solution. Addition of this reagent gives a red colour if bicarbonates and carbonates are present while a deep rose red colour will appear, if sodium hydroxide has been used as a neutralizer.

4.3.2 Procedure

Take 5 ml of milk in a test tube and add 5 ml of rectified spirit to it. Then add four drops of rosolic acid solution. The appearance of a red colour, or a deep rose red colour indicates the presence of a neutralizer while a brownish colouration shows absence of any neutralizer.

4.4 Detection of Extraneous Urea in Milk

4.4.1 General

Although addition of urea is prohibited under the *PFA Rules*, still it is added to the milk by unscrupulous persons to increase its viscosity thereby giving a feeling of rich milk.

4.4.2 Procedure

Take 5 ml of milk in a test-tube and add 5 ml of *p*-dimethyl amino benzaldehyde reagent to it. The appearance of a distinct yellow colour indicates the presence of added urea. The appearance of slight yellow colour may be ignored which may be because of the presence of natural urea in milk.

4.5 Detection of Sodium Chloride in Milk

4.5.1 General

Lactometer is a simple device which can be used to detect adulteration of milk with water. Addition of water alters the density of milk which can be read on the lactometer scale. Hence, to increase the density of milk, adulterant like sodium chloride is added.

4.5.2 Procedure

Take 2 ml of milk in a test-tube and add 0.1 ml of 5 percent potassium chromate solution and 2 ml of 0.1 N silver nitrate to it. The appearance of a yellow colour indicates the presence of added sodium chloride in the milk while the appearance of a brick red precipitate indicates the absence of added sodium chloride in the milk.

4.6 Detection of Metanil Yellow in Sweets

4.6.1 General

To make a sweet attractive, various colours are added to sweet preparations. As per the *PFA Act*, only natural food colours or permitted artificial food colours can be used in sweets. Metanil yellow is a cheap textile dye which is commonly used in colouring sweets which amounts to adulteration. The metanil yellow is carcinogenic.

4.6.2 Procedure

Take about 5 g of the sweet sample in a test-tube and add hot water to bring the sample in pure solution. Separate the coloured matter by filtration and add few drops of concentrated hydrochloric acid. The appearance of a pinkish red colour shows the presence of metanil yellow.

4.7 Detection of Washing Soda in *Bura* Sugar

4.7.1 General

Bura sugar is obtained by grinding plantation white sugar and finds extensive use in sweetmeat preparations and also for direct consumption. Its white colour makes it easily adulterable with washing soda which is harmful to the body, if consumed.

4.7.2 Procedure

There are two methods by which presence of washing soda in *bura* sugar can be detected.

4.7.2.1 Method I

Take about half tea spoon of *bura* sugar in test-tube and add some water to bring it to solution. Dip a strip of red litmus paper in the solution. The appearance of a blue colour on the litmus paper shows the presence of washing soda.

4.7.2.2 Method II

Take about half tea spoon of *bura* sugar in a test-tube and add few drops of 1:1 hydrochloric acid. The immediate appearance of small bubbles (effervescence) indicates the presence of washing soda in *bura* sugar.

4.8 Detection of Chalk Powder in *Bura* Sugar/*Jaggery*/Common Salt

4.8.1 General

Chalk powder is added to food items like *bura* sugar, *jaggery* and common salt as an adulterant to increase the weight. Chalk powder is carbonates of calcium which is insoluble in water and if consumed is injurious to health.

4.8.2 Procedure

There are two methods for detection of chalk powder in adulterated foods like *bura* sugar/*jaggery*/common salt.

4.8.2.1 Method I

Dissolve about 10-15 g of a sample in water in a beaker. Allow to settle for 5 min. The unadulterated samples will dissolve completely while the presence of any sediment at the bottom of the beaker will indicate the presence of chalk powder in the sample.

4.8.2.2 Method II

Take some sample of the food item to be examined in a test-tube and add few drops of 1:1 hydrochloric acid. The appearance of bubbles (effervescence) will indicate the presence of chalk powder in the sample.

4.9 Detection of *Vanaspati* in *Ghee* and Butter

4.9.1 General

Ghee and butter has been used in the Indian homes from times immemorial. The introduction of *vanaspati* into the Indian market has opened ways for adulteration of *ghee* and butter with *vanaspati*. The presence of *vanaspati* in *ghee* and butter can be checked indirectly by checking the presence of sesame oil which is normally one of the constituents of oils going into the manufacture of *vanaspati*.

4.9.2 Procedure

Take a little amount of melted *ghee* or butter (1 to 2 g) in a test-tube and add equal amount of concentrated

hydrochloric acid. Add a little sugar and shake vigorously. Let it stand for 5 min. The appearance of crimson red colour shows the presence of *vanaspati*.

4.10 Detection of Mashed Potatoes and Other Starches in *Ghee*/Butter

4.10.1 General

Mashed potatoes and edible starches are one of the adulterants in *ghee*/butter as these, without hampering the colour appeal of *ghee*/butter will add to the weight of *ghee*/butter.

4.10.2 Procedure

Take some *ghee*/butter in a test-tube and warm it. Add few drops of iodine solution to the sample. The appearance of a blue colour will indicate the presence of mashed potatoes and edible starches to *ghee*/butter.

4.11 Detection of Argemone Oil in Edible Oils

4.11.1 General

Argemone oil is a common adulterant in edible oils particularly mustard oil. Argemone oil contains the alkaloids sanguinarine and dihydro sanguinarine which are toxic and cause epidemic dropsy.

4.11.2 Procedure

4.11.2.1 Method I

Take small quantity of oil (4 to 5 ml) in a test-tube and add an equal quantity of concentrated nitric acid. Shake carefully avoiding any contact with the skin. The appearance of a red or reddish brown colour in the acid layer indicates the presence of argemone oil.

4.11.2.2 Method II

Take small quantity of oil (4 to 5 ml) in a test-tube and add some dilute hydrochloric acid to it. Mix well and add few drops of ferric chloride solution. The appearance of reddish brown precipitate indicates the presence of argemone oil.

4.12 Detection of Mineral Oil in Edible Oils

4.12.1 General

Mineral oil because of its colourless property is an easy adulterant with edible oils. Its presence in edible oil can be detected by a simple chemical reaction. Mineral oil which originates from petroleum are not saponifiable by alcoholic potassium hydroxide. They also give turbidity on addition of water.

4.12.2 Procedure

Take about 2 ml of the sample in a test-tube and add 2 ml of alcoholic potash to it. Warm the sample on a

low flame burner for about 10 min and add water to it. The appearance of turbidity shows the presence of mineral oil.

4.13 Detection of *Karanja* Oil (*Pungam* Oil)

4.13.1 General

Karanja oil (*Pungam* oil) is a cheap source of adulteration in mustard oil and groundnut oil.

4.13.2 Procedure

Take a little amount of mustard oil or groundnut oil in a test-tube and add few drops of antimony trichloride solution in chloroform and mix well. The appearance of a canary yellow or orange colour indicates the presence of *karanja* oil in mustard oil or groundnut oil.

4.14 Detection of Castor Oil in Edible Oils

4.14.1 General

Castor oil is another source of adulteration in edible oils. It gets mixed with edible oils very well and is not noticeable because of its colour.

4.14.2 Procedure

Take 1 ml of the sample and 10 ml of acidified petroleum ether to it. Shake for 10 min and add a drop of ammonium molybdate to it. The appearance of a white turbidity shows the presence of castor oil.

4.15 Detection of Added Dyes in Turmeric Powder

4.15.1 General

Yellow aniline dyes are added to turmeric powder as these are cheap source of adulteration and go unnoticed in its physical form.

4.15.2 Procedure

Take some turmeric powder in a test-tube and add water to bring it to the solution form. Add 1 to 2 ml of rectified spirit. An immediate separation of yellow colour in the rectified spirit will indicate the presence of added dyes.

4.16 Detection of Sudan III in Chilli Powder

4.16.1 General

Sudan III is an artificial colour which finds much use

in wax polishes. However, it has also been found that it is being used to give shineness to the chilli pods which ultimately find its way into chilli powder.

4.16.2 Procedure

Take 1 g of suspected chilli powder in a test-tube and add 2 ml of hexane to it and shake well. Let it settle for some time and decant the clear solution to another test tube. Add 2 ml of aceto-nitrile reagent and shake well. The appearance of a red colour in the lower aceto-nitrile layer is an indication of the presence of Sudan III.

4.17 Detection of Presence of Iodine in the Iodized Salt

4.17.1 General

Because of the medicinal reasons, iodization of the edible salt is being carried out in the country. As per the current regulation in force, salt containing less than 30 ppm of iodine is considered to be adulterated.

4.17.2 Procedure

Take about 5 g of salt in a test-tube and add 5 ml of water. Add 10 ml of 10 percent sulphuric acid solution. To this, add 10 ml of 10 percent potassium iodide solution followed by few drops of starch solution. Appearance of a blue colour indicates that the salt is iodized.

4.18 Detection of Chicory Powder in Coffee

4.18.1 General

Coffee powder means a material made from freshly roasted and ground pure coffee beans while chicory powder means the material prepared by roasting and grinding of cleaned and dried chips of chicory roots. The addition of chicory to the coffee is not allowed unless the product is labelled as coffee-chicory mixture. While a simple method involving physical means is described in Section I, another method involving a chemical reaction is described in 4.18.2.

4.18.2 Take about 2 g of the sample in a test-tube with 25 ml of water and boil. Filter and collect about 10 ml of the filtrate in another test-tube. Add 2 ml of resorcinol solution and boil. Appearance of a cherry red colour indicates the presence of chicory.

ANNEX A

(Foreword)

BOTANICAL NAMES OF THE PLANTS REFERRED IN THE STANDARD

<i>Sl No.</i>	<i>Common Name</i>	<i>Botanical Name</i>
(1)	(2)	(3)
i)	Argemone	<i>Argemone mexicana</i>
ii)	Asafoetida (<i>Hing</i>)	<i>Ferula foetida</i>
iii)	<i>Bajra</i>	<i>Pennisetum typhoideum</i>
iv)	Black pepper	<i>Piper nigrum</i>
v)	Cassia (<i>Tej</i>)	<i>Cinnamomum tamla</i>
vi)	Chicory	<i>Cichorium intybus</i>
vii)	Chilli	<i>Capsicum annuum</i>
viii)	Cinnamon (<i>Dalchini</i>)	<i>Cinnamomum zeylanicum</i>
ix)	Clove	<i>Syzygium aromaticum</i>
x)	Coffee	<i>Coffea arabica</i> and <i>coffea caenophora</i>
xi)	<i>Datura</i>	<i>Datura innoxia</i>
xii)	<i>Jaggery</i>	<i>Saccharum offinarum</i>
xiii)	<i>Khesari dal</i>	<i>Lathyrus sativus</i>
xiv)	Maize	<i>Zea mays</i>
xv)	Papaya	<i>Carica papaya</i>
xvi)	Peas	<i>Pisum sativum</i>
xvii)	Potatoes	<i>Solanum tuberosum</i>
xviii)	Pungam oil	<i>Pongamia pinnata</i>
xix)	<i>Rava</i>	<i>Triticum aestivum</i>
xx)	Saffron	<i>Crocus sativus</i>
xxi)	Tea	<i>Camellia sinensis</i> or <i>Thea sinensis</i>
xxii)	Turmeric	<i>Curcuma domestica</i>
xxiii)	Wheat	<i>Triticum aestivum</i>

Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 1986* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Director (Publications), BIS.

Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards : Monthly Additions'.

This Indian Standard has been developed from Doc : No. FAD 16 (1631).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

BUREAU OF INDIAN STANDARDS

Headquarters :

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110 002
Telephones : 2323 01 31, 2323 33 75, 2323 94 02

Telegrams : Manaksanstha
(Common to all offices)

Regional Offices :

	Telephone
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110 002	{ 2323 76 17 2323 38 41
Eastern : 1/14 C.I.T. Scheme VII M, V. I. P. Road, Kankurgachi KOLKATA 700 054	{ 2337 84 99, 2337 85 61 2337 86 26, 2337 91 20
Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160 022	{ 260 38 43 260 92 85
Southern : C.I.T. Campus, IV Cross Road, CHENNAI 600 113	{ 2254 12 16, 2254 14 42 2254 25 19, 2254 23 15
Western : Manakalaya, E9 MIDC, Marol, Andheri (East) MUMBAI 400 093	{ 2832 92 95, 2832 78 58 2832 78 91, 2832 78 92
Branches : AHMEDABAD. BANGALORE. BHOPAL. BHUBANESHWAR. COIMBATORE. FARIDABAD. GHAZIABAD. GUWAHATI. HYDERABAD. JAIPUR. KANPUR. LUCKNOW. NAGPUR. NALAGARH. PATNA. PUNE. RAJKOT. THIRUVANANTHAPURAM. VISAKHAPATNAM.	